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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
NOVOSAD, CHRISTOPHER J	
ART UNIT	PAPER NUMBER
3671	

DATE MAILED: 02/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/640,629	AUGUSTINE, ALBERT WILLIAM	
	Examiner	Art Unit	
	Christopher J. Novosad	3671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-7 and 13-23* is/are allowed.

6)☒ Claim(s) *8-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *08/14/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 8, line 3, the recitation "remote" is indefinite since "remote" is a relative term and it is not clear as to exactly what constitutes "remote".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 8-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Rosenberg *et al.* '811.

With respect to claims 8-12, Rosenberg *et al.* '811 disclose :

> A microprocessor is provided local to the interface device and reads sensor data from sensors that describes the position and/or other information about an object grasped and moved by the user, such as a joystick. The microprocessor provides the sensor data to a host computer that is coupled to the interface device by a communication bus that preferably includes a serial

interface. In a "host-controlled" embodiment, the host computer calculates force values using the sensor data and other parameters of a host application program and sends the force values to the local microprocessor, which directly provides the force values to actuators to apply forces to the user object. In a "reflex" embodiment, the host computer sends high level supervisory commands to the local microprocessor, and the microprocessor independently implements a local process based on the high level command for reading sensor data and providing force values to the actuators using sensor data and other parameters. Such user interaction can be implemented through the use of a human-computer interface device, such as a joystick, "joypad" button controller, mouse, trackball, stylus and tablet, or the like, that is connected to the computer system controlling the displayed environment.

(12) More particularly, a system of the present invention for controlling an electromechanical interface apparatus manipulated by a user includes a host computer system for receiving an input control signal and for providing a host output control signal. The host computer updates an application process, such as a simulation or video game process, in response to the input control signal. A processor local to the interface apparatus and separate from the host computer receives the host output control signal and provides a processor output control signal. An actuator receives the processor output control signal and provides a force along a degree of freedom to a user-manipulated object coupled to the actuator in accordance with the processor output control signal. A sensor detects motion of the object along the degree of freedom and outputs the input control signal including information representative of the position and motion of said object. Preferably, the sensor outputs the input control signal to the local processor, which outputs the input control signal to the host computer.

(13) In one host-controlled embodiment, the host computer receives the sensor information in the input control signal and determines the values of the forces. The host output control signal thus is the determined direct force command or force value that is relayed to the processor, and from the processor directly to the actuator. In a second, "reflex" embodiment, the host computer receives the sensor information in a supervisory mode and outputs a high level force command whenever a force is required to be applied to the user object or changed. The processor reads sensor information and outputs low level force commands or values to the actuator according to a subroutine or

low-level process that is selected in accordance with the high level force command. The subroutine can include force equations or a force profile of predetermined force values. The processor thus implements a "reflex" to control forces independently of the host computer until the host computer changes the type of force applied to the user object.

(14) The process updated by the host computer system preferably includes application software that can be simulation software, game software, scientific software, etc. The host computer system displays images on a visual output device such as a display screen and synchronizes the images and visual events with the position and motion input from the user manipulating the object as well as forces applied to the object. The host computer also preferably synchronizes the timing and magnitude of audio feedback with force feedback. The present invention can use a standard serial interface included on many computers to interface the host computer system with the local microprocessor. Alternatively, a parallel interface can be used, or a serial interface used in conjunction with a different interface on the host computer, such as a game port. A clock is preferably coupled to the host computer system or the local processor which can be accessed to determine, in part, the force output by the actuator.

(15) The object is preferably grasped and moved by the user, and can include such articles as a joystick, mouse, steering wheel, medical instrument, or other object. The object can preferably be moved in one, two, or three degrees of freedom using, for example, a gimbal or slotted yoke mechanism, wherein an actuator and sensor can be provided for each degree of freedom. The actuator can be active or passive; for example, active actuators can include motors, pneumatic/hydraulic actuators, torquers, voice coils, etc. Passive actuators can include brakes, fluid controller dampers, etc.

(16) A method for controlling an force feedback interface device manipulated by a user is similar to the apparatus described above, and includes a step of inputting a position signal to the host computer system from the sensor. The position signal includes information representative of the position and motion of the object of the interface device grasped by the user. A host force command is output from the host computer system to the local processor, and a processor force command is output from the processor to the actuator. A

force from the actuator is provided to the object grasped by the user, wherein a direction and a magnitude of the force is in accordance with the processor force command. The position signal is preferably input to the processor and is input to the host computer system from the processor. Both a host-command embodiment and a reflex embodiment are provided. A magnitude of the force provided by the actuator is determined by the host computer or the local processor. This magnitude can be determined from parameters including the position of the object along provided degrees of freedom, the velocity of the object moving along the degree of freedom, and/or the acceleration of the object moving along the degree of freedom. The force can thus simulate different types of forces such as a spring force, damping force, or inertia force. In addition, the modulation of the force can be determined, in part,from a clock that provides timing information for the force commands.

(94) Actuator 202 transmits a force to object 34 and is preferably grounded.

It is to be noted that Braun *et al.* '349, Rosenberg *et al.* '439, Rosenberg *et al.* '579, Rosenberg *et al.* '032, Rosenberg *et al.* '674, Martin *et al.* '077 and Roston *et al.* '023 could also have been applied in a rejection of claims 8-12 under 35 U.S.C. 102(b) but have not been to avoid undue multiplicity.

Allowable Subject Matter

Claims 1-7 and 13-23 are allowed.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Numata *et al.* '175 B2 discloses a manual input device with force feedback function and vehicle-mounted equipment controller using same. The actuator 5 of Numata *et al.* is not hydraulic but rather is a DC motor or a stepping motor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher J. Novosad whose telephone number is 703-308-2246. The examiner can normally be reached on Monday-Thursday 5:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Will can be reached at 703-308-3870. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christopher J. Novosad
Primary Examiner
Art Unit 3671

February 12, 2004